view | Dynamic Glass

May 20, 2019

The Honorable Richard Neal
Chairman
House Committee on Ways and Means
1102 Longworth House Office Building
Washington D.C. 20515

Dear Chairman Neal:

Thank you for holding the first hearing in over a decade within the Ways and Means Committee on climate change. I appreciate your commitment towards a cleaner energy future and the opportunity to submit written comments for inclusion in the official hearing record.

My comments are focused on two interconnected items related to electrochrominc glass. First and foremost is its ability to significantly reduce greenhouse emissions related to commercial buildings. Second, but also of note, is the benefits to health and wellness it brings to individuals in buildings via increased access to natural light and views of the outdoors.

By way of background, View Dynamic Glass (View) is one of several US manufacturers of electrochromic glass. View is headquartered in California, manufacturers its product in Mississippi, and has worked assiduously for more than a decade to deploy transformative clean energy technologies in the commercial building sector. Under automated control, electrochromic glass technology moves ions within the glass to change its tint, interacting with the sun and absorbing unwanted solar light and heat. The result is a building with enhanced occupant experience, improved thermal comfort and uninterrupted views. This solar-activated technology significantly reduces a building's peak load (HVAC is downsized by 20 to 30%) and ongoing operational savings (15-25%) for buildings of all types.

This is important because commercial buildings account for 19 percent of total energy consumed in the United States and is growing over time. More than half of the energy used by commercial buildings goes toward the heating and lighting that electrochromic glass impacts.[i] In sum, the commercial buildings sector represented approximately 440 million metric of tons of carbon dioxide equivalent or approximately 7 percent of the nation's total emissions.[ii]

Lawrence Berkeley National Laboratory has shown that electrochromic glass can have a profound impact on the country's total greenhouse gas emissions. They calculate that

Headquarters
195 South Milpitas Blvd., Milpitas, California 95035
Tel 408.263.9200 Fax 408.263.9228

Manufacturing Facility
12380 Kirk Rd., Olive Branch, Mississippi 38654
Tel 662.892.3415 Fax 662.892.3430

viewglass.com

today's commercial windows consume 1.56 EJ or approximately 430 billion kilowatt hours of electricity. However, if these windows were replaced with electrochromic technology, that energy loss could be converted to a 1.16 EJ or approximately 320 billion kilowatt hour net energy gain. In other words, electrochromic windows could be net producers of energy by optimizing heating and lighting within buildings.[iii]

These conclusions were reinforced by the Buildings Technology Office (BTO) at the Department of Energy. In 2014 they analyzed dynamic window and shade technologies and found that if all the windows in new and existing buildings are replaced, today's state-of-the-art electrochromic windows have the potential to save 724 TBtu commercial sectors by 2030[iv]. In terms of savings, for each $1 of installed cost, electrochromic glass saves 0.36 kWh/year. For most of the United States, solar photovoltaic systems produce an average of 0.14 kWh/year, over the life of the system. BTO finds that electrochromic windows can be twice as impactful as PV on a per square foot basis.

While electrochromic glass is an emerging technology, the greenhouse gas reductions from additional deployment of this technology can be profound for our country. For instance, if only 20 million square feet of electrochromic glass is installed over the next five years, it would roughly translate into reducing at least 100,000 metric tons of carbon dioxide emissions or the equivalent of planting 2.6 million trees or foregoing the burning of 112 million pounds of coal.

While Congress has made a variety of changes over the last decade to the business energy investment tax credit on matters such as the commence construction modification, Congress has not updated the list of technologies eligible to receive the business energy investment tax credit to account for new clean energy technologies. These technologies, such as electrochromic glass, have surpassed the current law as the original authors of this provision could have never envisioned technologies such as electrochromic glass.

The applicability of electrochromic glass is demonstrated because the technology is an active use of solar energy that is distinct from passive solar equipment, like a greenhouse, that is typically not considered eligible for the tax credit. Second, electrochromic glass provides an amalgamation of current technologies that receive the business energy investment tax credit, such as photovoltaic panels that use solar energy to generate electricity and solar thermal systems that provide heating and cooling for structures using solar radiation.

This technology also provides substantial health and wellness benefits for individuals in buildings. In 2017, Cornell University conducted a study of workers across North America who worked in offices with traditional windows or offices electrochromic windows. Overall, workers in offices with electrochromic windows reported a 51 percent drop in the incidence of eyestrain, a 63 percent drop in headaches, and a 56 percent reduction in drowsiness, all of which hurt worker productivity. The lack of daylight and

access to views decreases the ability of the eye to relax and recover from fatigue. By outfitting offices with electrochromic glass, companies can increase workers' ability to work comfortably longer. A related study by researchers at Carnegie Mellon and the University of Southern California found that occupants with electrochromic glass were 22 percent more productive and had 13 percent better concentration.

This can have a multitude of positive impacts as improving light quality leads to an increase in the well-being and work-related performance of their employees. These findings demonstrate they should invest heavily in bringing the optimal amount of natural light into their offices. By harnessing the power of daylight in the workplace, while utilizing technologies that maximize its benefits and minimize its drawbacks, companies will enjoy more productive, alert and healthy workers.

As the 116th Congress continues to work to invest in clean energy innovation and its ability to create good paying domestic jobs, I hope attention is given towards making advances within the Section 48 business energy investment tax credit given its ability to aggressively advance and deploy transformative clean energy technologies. To date, the effort to update this section of the business energy investment tax credit has been championed by a bipartisan group of members in the House and Senate. I applaud their work to broaden the types of clean energy technologies eligible to receive the business energy investment tax credit.

The ability for electrochromic glass to become eligible for the business energy investment tax credit would provide a substantial boost to the ability to deploy this technology at a rapid pace. Increased adoption nationally would drive increased domestic manufacturing for this product including expansion of our manufacturing facility in Mississippi and for the numerous other domestic manufacturers of this clean energy technology.

Thank you for your shared commitment towards a cleaner, greener, and more secure energy future. I appreciate your consideration of my views and am available to work with you or the respective members of your staff to help advance this effort in the future.

Sincerely,

Brandon Tinianov, PhD, PE
Vice President
Industry Strategy

Headquarters
195 South Milpitas Blvd., Milpitas, California 95035
Tel 408.263.9200 Fax 408.263.9228

Manufacturing Facility
12380 Kirk Rd., Olive Branch, Mississippi 38654
Tel 662.892.3415 Fax 662.892.3430

viewglass.com

[i] American Council for an Energy-Efficient Economy. https://aceee.org/sector/commercial

[ii] Environmental Protection Agency. Inventory of U.S. Greenhouse Gas Emissions and Sinks. https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf

[iii] Lawrence Berkeley National Laboratory. Integrating Advanced Facades Into High Performance Buildings. https://cloudfront.escholarship.org/dist/prd/content/qt30g0h715/qt30g0h715.pdf

[iv] United States Department of Energy, Building Technologies Office. Windows and Building Research and Development. https://www.energy.gov/sites/prod/files/2014/02/f8/BTO_windows_and_envelope_report_3.pdf